



Science Shoebox Activity: Have a Heart

Task Objective: Students will demonstrate that their heart rate can be determined using different methods and will observe that exercise increases their heart rate.

7th grade Content Area: Life Science

Content Standard: 1.0 Cell Structure and Function

Objective: 7.1.spi.5 Students will be able to determine the relationships among cells, tissues, organs, and systems given a diagram and identify the function of organ systems.

Materials:

- 3 feet of plastic tubing
- 2 funnels
- Play-Doh
- Toothpicks
- A timer or clock with a second hand
- Student Directions sheet

Across the Curriculum **(Note to Spring 2012 group & beyond... you will need standards for these when you write yours)**

1. Social Studies – The teacher will provide pictures of different sports associated with other countries. The teacher will ask the children how they think each sport originated and will lead a discussion on this topic, relating it to the country, customs, climate, etc.
2. Literature – Students will find books in the library on sports, fitness, or health and will prepare book reports to share with the class.
3. Math – Students will plan games such as relays, broad jumps, running, walking, etc., which they can do at school. They will take their pulse before and after each event and will chart these figures individually and then combine their results as a class on a chart or graph.
4. Art – Students will bring in pictures from magazines of different activities, exercises, and sports and design a bulletin board around the theme “How Fit is Your Heart”. Each picture will have a caption with the student’s estimation of the heart rate associated with that sport or activity. They will use the information from the previous math activity to make their estimations. Information from the library reference books or classroom resource books can be used to confirm their estimates.

Bibliography

Bosak, S. V., Bosak, D. A., and Puppa, B. A. (1991). Science Is..... Ontario: Scholastic Canada Ltd.

Forbes, E., Hale, J., Christianson, C. (1996). Simple Science Fun: Hands-on Science Made Easy. Huntington Beach, CA: Teacher Created Materials.

VanCleave, J. (1993). 200 Goopy, Slippery, Slimy, Weird & Fun Experiments. New York: John Wiley & Sons, Inc.

Background

The heart must contract to pump blood into the arteries. This rhythmic contraction of the heart is the “heartbeat”. You can’t really hear a heartbeat. What we can hear is the heart valves opening and shutting. When the heart contracts to force blood out into the arteries, the walls of the arteries stretch. As the heart relaxes, the artery walls contract to push the blood along. One “pulse beat” is produced each time the heart beats and the artery walls expand.

A person’s physical condition and activity determine how much energy the body needs. The heart supplies the oxygen necessary for this energy. Because a physically active body uses a lot of energy and a lot of oxygen, the heart beats faster and the person must breathe deeper to supply that oxygen.

You can tell how fast your heart is pumping by counting your pulse beats. The normal pulse rate varies according to the age and physical condition of the individual. A healthy, fit heart can do the same amount of pumping work with fewer beats than a weak heart. A person’s resting pulse rate decreases with age: a newborn will have a pulse rate of about 130-150 beats/minute, an 11 year old about 70-100 beats/minute, and an adult usually will have about 60-80 beats/minute.

Have a Heart Shoebox Student Directions

Task Objective: Your heart rate can be determined using different methods and you will observe that exercise increases your heart rate.

Record all answers in your learning log. Create a chart to record the data.

1. Insert one of the funnels into each end of the plastic tubing. You have just made a stethoscope!
2. Place one end of your stethoscope over your heart and the other end over your ear and listen. After awhile, count the number of heartbeats you feel in 15 seconds. Multiply that number by four. This is your resting heart rate.
3. Insert one toothpick into a very small piece of Play-Doh.
4. Flatten the bottom of the Play-Doh.
5. Place your left wrist, palm side up, on a table.
6. Place the Play-Doh on your wrist and move it around on the thumb side of the wrist until the toothpick starts to slowly vibrate back and forth. You have now made a pulse meter.
7. Count the number of vibrations that the toothpick makes in 15 seconds: in one minute. Are these the same as you observed when listening to your heart with the stethoscope? This is your resting heart rate.
8. Can you feel your pulse in the same place on your wrist by using the first two fingers of your right hand?
9. Take your pulse while sitting, standing, and lying down. Hop 25 times and take your pulse. Hop 100 times and take your pulse.

Assessment (Note to Spring 2012 group – you will be creating a FACT for yours instead of writing assessment questions – this part is not required)

1. Of the methods you used to determine your heart rate which did you prefer and why? Do you know of other methods to determine your heart rate? If yes, what are they?
2. List all of the activities and sports you can find represented on the outside of the shoebox.
What do you think the person's heart rate would be for each activity or sport you listed? Write this beside the activities you listed.
3. List as many other sports and activities you can think of. Which of these activities do you like to do?
4. Do you think it is good or bad for your heart to beat faster when you exercise? Tell why you think this is true.

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